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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,582	10/25/2003	Carl Staelin	200311420-1	9487

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EXAMINER
LAVIN, CHRISTOPHER L

ART UNIT	PAPER NUMBER
2624	

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06/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/692,582

Applicant(s)

STAEIN ET AL.

Examiner

Christopher L. Lavin

Art Unit

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 4, 8 - 17, 21 - 25 and 29 is/are rejected.
- 7) ☒ Claim(s) 5 - 7, 18 - 20, and 26 - 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 13 is rejected under 35 U.S.C. 101 because it is non-statutory. It is claiming an image (which is non-functional material) on a memory. An image is not a method or program, and therefore it not statutory.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7, 20, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Particularly the claims all depend from claims calling for computing the "connection weights" using "gradients". However, the claims themselves call for computing the "connection weights" using a "non-gradient decent algorithm". Therefore the claims conflict with the claims they depend from.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 – 4, 8 – 17, 21 – 25 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Huang et al. ("Adaptive MLP post-processing for block-based coded images"; Y.-L. Huang and R.-F. Chang; IEE Proc.-Vis. Image Signal Process, Vol. 147, No. 5, October 2000).

In regards to claim 1, Huang discloses A method comprising at least one of training and using a neural network to reduce artifacts in spatial domain representations of images that were compressed by a transform method and then decompressed (p. 464, section 2).

In regards to claim 2, The method of claim 1, wherein the neural network is trained to reduce the artifacts using a training set, the training set including first and second images, the second image being a version of the first image that was compressed by a transform method and then decompressed (p. 467, section 4).

In regards to claim 3, The method of claim 2, wherein the neural network includes a plurality of connection weights (p. 464, sections 2 and 3); and wherein the training includes: supplying the second image to an input of the neural network (p. 464, sections 2 – 4); using the neural network to generate an output image (p. 464, sections 2 – 4); determining differences between the output image and the first image (p. 464, sections 2 – 4); and using the differences to adjust the connection weights of the neural network (p. 464, sections 2 – 4).

In regards to claim 4, The method of claim 3, wherein the transform method included dividing the first image into pixel blocks; and wherein pixel locations within their transform blocks are also supplied to the neural network during the training (p. 464, sections 2 – 4).

In regards to claim 8, The method of claim 3, wherein the neural network processes more than one pixel at a time (Figure 2).

In regards to claim 9, The method of claim 3, wherein input and output data of the neural network are coded to improve the neural network accuracy (This is the basic premise of any neural network training.).

In regards to claim 10, The method of claim 1, wherein the neural network is used by inputting at least a luminance channel of the spatial domain representation to the neural network (p. 464, sections 2 – 4: The pixel values are luminance values.).

In regards to claim 11, Apparatus comprising a processor programmed with the trained neural network of claim 1 (p. 469, Section 4.1: Discloses an Intel Pentium processor.).

In regards to claim 12, An article comprising computer memory encoded with the trained neural network of claim 1 (p. 469, Section 4.1).

In regards to claim 13, An article comprising computer memory encoded with an output image produced by the trained neural network of claim 1 (p. 469, Section 4.1; see all of the figures with output results as well.).

In regards to claim 14, Apparatus comprising a neural network trained to reduce artifacts in an image that was transformed from a spatial domain to a frequency domain and transformed back to the spatial domain (p. 468, sections 1 – 3).

In regards to claim 15, claim 15 is rejected for the same reasons as claim 1. The argument similar to that presented above for claim 1 is applicable to claim 15. Claim 15 distinguishes from claim 1 only in that it recites more details on the transform (which Huang clearly discloses in sections 1 and 3).

In regards to claim 16, The apparatus of claim 15, wherein the neural network includes a plurality of connection weights (p. 464, sections 2 – 4); and wherein the training means uses a first image to generate an output image (p. 464, sections 2 – 4); determines differences between the output image and a second image (p. 464, sections 2 – 4); and uses the differences to adjust the connection weights of the neural network, the first image being a version of the second image after compression in the frequency domain and then decompression (p. 464, sections 2 – 4).

In regards to claim 17, claim 17 is rejected for the same reasons as claim 4. The argument analogous to that presented above for claim 4 is applicable to claim 17.

In regards to claim 21, The apparatus of claim 16, wherein the training means generates input vectors for the pixels in the first image, and processes the input vectors independently of one another to generate the output image, each input vector including a neighborhood of pixels (Figure 2: This is the basic idea of a neural network.).

In regards to claim 22, claim 22 is rejected for the same reasons as claim 12. The argument analogous to that presented above for claim 12 is applicable to claim 22.

In regards to claims 23 – 25 and 29, claims 23 – 25 and 29 are rejected for the same reasons as claims 15 – 17 and 21. The argument analogous to that presented above for claims 15 – 17 and 21 is applicable to claims 23 – 25 and 29.

Allowable Subject Matter

6. Claims 5 – 7, 18 – 20, and 26 – 28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The art of record does not teach nor does it suggest the specific features called for in the claims, in particular the concept of training a neural network by analyzing the errors in a neighborhood as apposed to the traditional mention of training based on the error at a pixel location. The concept of spatial error correction in neural networks is novel, further detail on the approach can be found in the applicant's own patent application (10/600,671) and their published literature, "Neural Network Image Scaling Using Spatial Errors".

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

9. Kwon et al. "Blocking "Artifacts Reduction Algorithm in Block Boundary Area Using Neural Network", 2001 IEEE – discloses another Neural Network used to remove blocking artifacts.

Art Unit: 2624

10. US Pat. 6,119,083 – discloses a neural network for distortion correction in images.


11. US Pat. 7,092,573 – discloses deblocking using neural networks.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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